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ABSTRACT

Both interactive (two-way) and traditional (one-way) television programs on new ideas about teaching were made available to teachers in a study of using cable television as a delivery system for diffusing new ideas in schools. Teachers of grades one through six in 41 schools were interviewed before and after a full year of using the interactive and traditional television programs. The participating teachers taught in (1) 14 schools with interactive cable facilities, (2) 12 schools with conventional one-way cable television, and (3) 15 schools that received neither of the televised inservice programing notes but which continued traditional inservice training sessions. In addition to their experience with and evaluations of the cable programing, the teachers responded to questions about their teaching experience, job satisfaction, level of commitment to a teaching career, and new ideas they had encountered about teaching. The findings suggested that characteristics of the individual organization (such as the level of agreement among staff about good teaching and the amount of communication within the organization about new ideas) played important roles in the diffusion and implementation process. Presence of both interpersonal and technological interaction had positive effects on learning and implementing new ideas. The study produced a strong argument for considering variables related to the viewing situation--such as coviewer interaction--and structural characteristics of communication patterns within existing groups. (RL)

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# Communicating Innovations Via Television: A Study of Learning Within a Social Context

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Traditionally researchers have viewed the mass media as one-way channels. In particular, studies of various media have tended to focus on resulting behavioral or cognitive responses following exposure to certain types of content--educational, persuasive, prosocial, aggressive, political, or entertaining. Some researchers have attempted to incorporate potential mediating factors into their work, including, for example, presence of co-viewer interaction or characterizations of the surrounding environment, thus attempting to estimate a more complex and differentiated model of the flow of mass mediated information.

Individuals live in complex environmental contexts; they are constantly exposed to information from a variety of sources--family, peers, schools, churches, political interest groups, media, and so on. All of these factors, to varying degrees, contribute to individuals' understanding of the world around them. As Comstock, Chaffee, Katzman, McCombs, and Roberts (1978) suggest, "All social influence whether emanating from a television program, a parental proscription, or a teacher's lesson, is mediated by conditions and contingencies that derive from other sources of influence. Although it makes research difficult, this is the way the world operates" (Comstock et al.,1978, p. 286).

The purpose of this paper is to examine the role of various information systems and aspects of the communication environment in the diffusion of innovation within an organizational context. In particular, the study compares

different sources of information in conjunction with environmental factors and assesses their ability to a) communicate the innovation, and b) provide the individual with enough information and stimulation so that s/he can actually implement it.

Various studies have consistently reported that viewing television within an educational context will result in positive and significant differences in comparison with other media in learning and perhaps even behavioral effects. However, these results have not been replicated in a field study, and furthermore no other estimates of social structure or context have been examined in conjunction with learning effects in these experiments. This study provides data on 1) the role of various information systems in terms of the degree to which teachers turn to them for new ideas within organizational settings having unique communication characteristics; 2) the effects of new technology, that is, the introduction of in-service on cable in the experimental groups, compared to traditional instructional media in the control schools; and 3) the efficacy of these different information systems, including cable television, as well as traditional sources in predicting actual innovative behavior (implementing the ideas).

Television as Instructor

There is a long tradition of investigation into the general issue of adult learning from various instructional media. In particular, studies have compared the

effectiveness of television with other instructional media since the early 1950's. One classic investigation (Tannenbaum, 1956) tested adult learning in four different conditions which presented educational content using a film strip, a manual, three television lectures viewed over a period of three weeks, and three television lectures viewed all in one sitting. His results demonstrated the greatest learning effects for the three televised lectures viewed together, then for the three lectures viewed over a three-week period, followed by the manual, with the film strip being the least effective. Other studies in this tradition have yielded similar results testifying to the relative effectiveness of television in comparison with other media as an educator for adults learning in a school context (cf. Bryan, 1961; Corle, 1967; McIntyre, 1966, Rock, Duvan, and Murray, 1953; and Williams, Paul, and Ogilvie, 1957).

We seem to know a fair amount, therefore, about adult learning from television, compared to other sources of information. But these insights stem from research conducted in a relatively limited context; that is, in cases where an already motivated subject views overtly educational content in isolation and within a learning context.

Most studies on the educational use of various media, and television in particular, have demonstrated a decided preference for the control of the laboratory setting. Recently, however, several investigators have called for greater emphasis on a realistic or naturalistic study of the

television experience and concerted efforts to sort out its relationship to other factors in the naturalistic environment which define social context (cf. Dorr, 1978; Winick and Winick, 1979). However, no major study has yet attempted to analyze the interpersonal aspects of the television experience for the adult viewer in either a naturalistic or experimental context.

Dorr's review of the literature (1978) summarizes the current state of the art as follows:

> All the studies I have reviewed suggest that learning from television may be enhanced by attention-directing and educationally supplementing content. They also suggest this may be done by a parent, a teacher, or an unfamiliar adult, who may or may not be physically present, with either instructional or entertainment programming. There is enough work to believe this is possible with preschoolers and with elementary school age children, but we cannot be so certain about the effects with older viewers.
>
> (Dorr, 1978, p. 26)

Interaction Effects

In their efforts to study the complexities of the real world, researchers have found that one factor, co-viewer interaction, has consistently predicted such dependent measures as aggressive behavior and prosocial learning from television. Studies on interpersonal factors mediating between viewers and aggressive television content have adopted a behavioral criterion variable, and the results in this area suggest that the presence or absence of a familiar co-viewer is a reliable predictor of subsequent aggressive behavior (cf. Steuer, Applefield, and Smith, 1971; Thomas, 1972). Many studies of children have found them to be less

aggressive when an adult is merely present during viewing.

Some researchers have used similar experimental designs but have required verbal evaluative interaction between the adult and the child (cf. Grusec, 1973; Hicks, 1968). Again the adult's role proved crucial in predicting behavior. This finding has maintained reliability with college students, when males exposed to an authority figure's negative evaluative comments on aggressive content administered weaker electric shocks following viewing than those who simply viewed the content with no adult interactions (Lefcourt et al., 1966).

Other researchers have used educational programming to examine the effects of interpersonal interaction. Rather than a behavioral measurement, most of these studies have relied on amount of learning as the dependent variable; most also rely on interactions between a teacher figure and preschool or elementary students as subjects (Borton, 1971; Corder-Bolz and O'Bryant, 1978; Friedrich and Stein, 1975; Singer and Singer, 1974). All of the studies report greater learning as a result of adult interaction and reinforcement of concepts, actions and themes. The effects of mothers' interactions with preschool children have yielded similar results with educational programming (Ball and Bogatz, 1970; Bertram, Pena, and Hines, 1971; Salomon, 1977); that is, the children learn significantly more if their mothers watch the programs with them and interact with them in some way relevant to the content.

One of the most recent and elaborate studies dealing with the effects of adult interaction on learning from television is the Freestyle project (Johnston, in press). Dealing with fourth through sixth graders as subjects, Johnston found significant increases in learning as a result of teacher-student activities--discussion, role-playing, games and other classroom interaction--based on program content from the Freestyle series.

The study reported here offers a rather unique opportunity to explore the role of various media as instructional systems for the adult, where exposure to content is voluntary and estimates of the communication context, potential mediators or reinforcers of content, are included in the analysis. Although the data presented in this paper cannot possibly resolve the many unanswered questions and broad issues relating to adult learning from the media in a social context, this field study is unusual in its focus on adult behavior within organizations and in its examination of their use of various mass media and interpersonal sources available to them. In his classic book on the diffusion of innovation, Rogers stated, "A combination of mass media and interpersonal channels is the most effective way of reaching people with new ideas and persuading them to utilize these innovations" (Rogers, 1971, p. 260). Data from this study, combining mass media and interpersonal channels, yield further insight into the diffusion process in terms of both learning about and

implementing innovations.

Design

In 1974 the National Science Foundation appropriated funding for a number of interactive cable projects (Brownstein, 1978). In general, findings from those studies which focused on learning variables tended to support the cost-effectiveness of implementing interactive cable programs. Studies in fire prevention and teacher training (Baldwin et al., 1978; Clarke et al., 1978; Lucas, 1978) resulted in positive learning effects following exposure to interactive programming. Preliminary findings in these studies suggested that training via interactive cable can be more enjoyable and effective than more traditional modes of instruction.

The data examined here provide greater insight into both traditional (one-way) and interactive (two-way) cable television, as well as alternative information systems, in their respective roles as educators within unique organizational settings. Respondents, elementary school teachers and principals in Rockford, Ill., discussed their uses of numerous sources of information, such as print media (books, magazines, newspapers and professional journals), films and television, and interpersonal sources (teachers, principals, friends), for learning about new ideas.

Teachers at the 41 elementary schools who participated in the experiment were divided into three treatment groups: those working in 14 schools with interactive cable

facilities; teachers in 12 schools with conventional one-way cable television; and those in 15 schools which received none of the televised in-service programming but which continued traditional in-service training sessions. Data were gathered before and after the period of experimental program delivery, which extended across an entire school year. Teachers in grades one through six and their principals were included in the study.

Following a full year of program delivery, teachers were questioned about such topics as their teaching experience, job satisfaction, level of commitment to a career of teaching, and new ideas they had encountered about teaching. In addition, respondents discussed their experience with and evaluations of the cable programming. Detailed interview records were compiled during all waves of data collection, and contacts in a random ten per cent of cases were confirmed independently.

Programming

Eight shows centered on topics nominated by teachers were eventually produced using local elementary staff members as on-screen talent. The first three programs dealt with teaching metrics; the next four focused on various aspects of language arts teaching; and the final program concentrated on helping students put together science fair projects for local and state competitions.

Interactive segments were edited into the programs reinforcing certain points and asking opinion and factual

questions about the content. All viewers in both one-way and interactive schools could hear the interactive segments, but only viewers in schools with interactive facilities were able to punch in responses on a terminal and receive feedback about other teachers' answers, providing a broader perspective on their own thoughts.

The Variables

The first independent variable of concern here is the treatment group to which the individual school was assigned. The three groups consisted of control schools, where traditional in-service training continued uninterrupted; one-way experimental schools, which provided in-service training programs for teachers via cable television; and interactive experimental schools, where teachers could view the in-service programs, respond to questions edited into the programs, and receive spontaneous feedback on their answers.

Because viewing was primarily voluntary (outside of a few demonstration meetings), a self-report measurement of exposure was also included in the analysis. Teachers in the two experimental treatments (one-way and interactive cable television) were asked:

> Did you watch any of the in-service programs on television?

Inclusion of these first two independent variables (treatment and exposure) in the analysis permits the estimation of experimental and viewing effects. However, we hypothesized that certain environmental characteristics,

apart from treatment group, would possibly play critical roles in enhancing or inhibiting the diffusion of innovations. As a result, we created two additional independent variables and included them in this analysis. They are based upon social factors that shape responses to innovative ideas and mediate the effects of in-service training within the individual school.

Two dimensions of structure were selected as the focus of attention here. One is concordance, that is, the degree to which teachers agree on the definition of good professional performance. Teaching norms prescribe the range of acceptable, rewarded behavior in the workplace. The diffusion of innovation process should operate quite differently in schools where low levels of agreement, and thus diverse opinions, exist, as opposed to homogeneous schools, where most teachers share a monolithic and perhaps closed view of good teaching. The second structural variable is the degree of communication among the staff about work. Communication expresses the openness of teachers to sharing classroom experience with others. Again, variance in the amount or structure of communication that characterizes the organization should be related to greater or lesser facilitation of innovation within the school.

Our measures of concordance and communication draw upon an extensive gathering of sociometric data within each school. Findings concerning these two independent variables

are interesting in themselves. Teachers were presented separate lists of staff members who worked in their building and were asked for two kinds of responses.

> (Please indicate) people at your school who have especially good ideas about teaching;
>
> (Please indicate) persons you discuss teaching ideas with at least once a week.

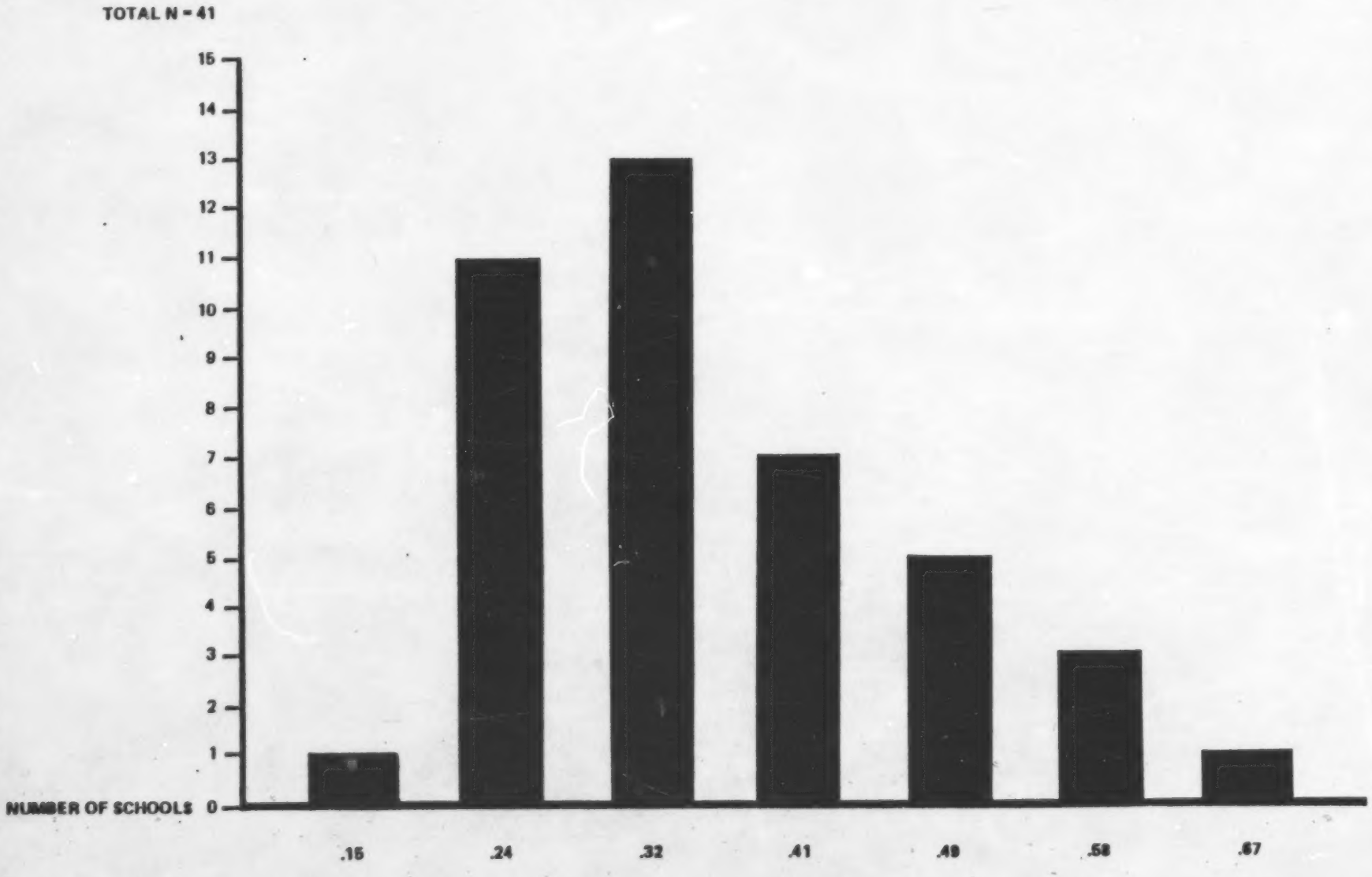
Agreement about good teaching performance was indexed in each building by calculating the concordance coefficient, or average rank correlation, among nominations made by all staff members interviewed. Figure 1 contains a histogram of these concordances for the 41 schools in the experimental design, divided into seven categories (with interval widths of approximately .13). Both the magnitude of norm diversity across buildings and the shape of the distribution convey useful information about schools as workplaces.

Most buildings (the lower three categories, or 26 schools) contain staffs whose intercorrelation is less than .35. The level of statistical significance varies for buildings, of course, depending upon the number of teachers interviewed. But this threshold of agreement about colleagues with good teaching ideas explains only a small amount of the variance in these judgments and suggests considerable difference of opinion allowing a variety of role models.

Communication in the 41 buildings is equally skewed, and in the direction of high values. Nominations of talking

FIGURE 1

AVERAGE TALKING LINKS REPORTED



partners for discussing new ideas were percentaged over a total number for each building, reflecting the largest number of mentions possible, given faculty size. The histogram in Figure 2 shows a third or fewer talking links being used in most buildings. Only nine schools had staffs whose reports of talking about work absorbed nearly one-half or more of the interaction dyads possible.

A primitive picture of schools as workplaces emerges from these data. Despite facilities for socializing (offices and lounges), a lack of hierarchical structure, and small staffs, teachers differ widely in their definition of good performance; and they talk about work selectively with only a few colleagues.

The independent variable identifying the source of the new idea mentioned by the subject is based on responses to the following:

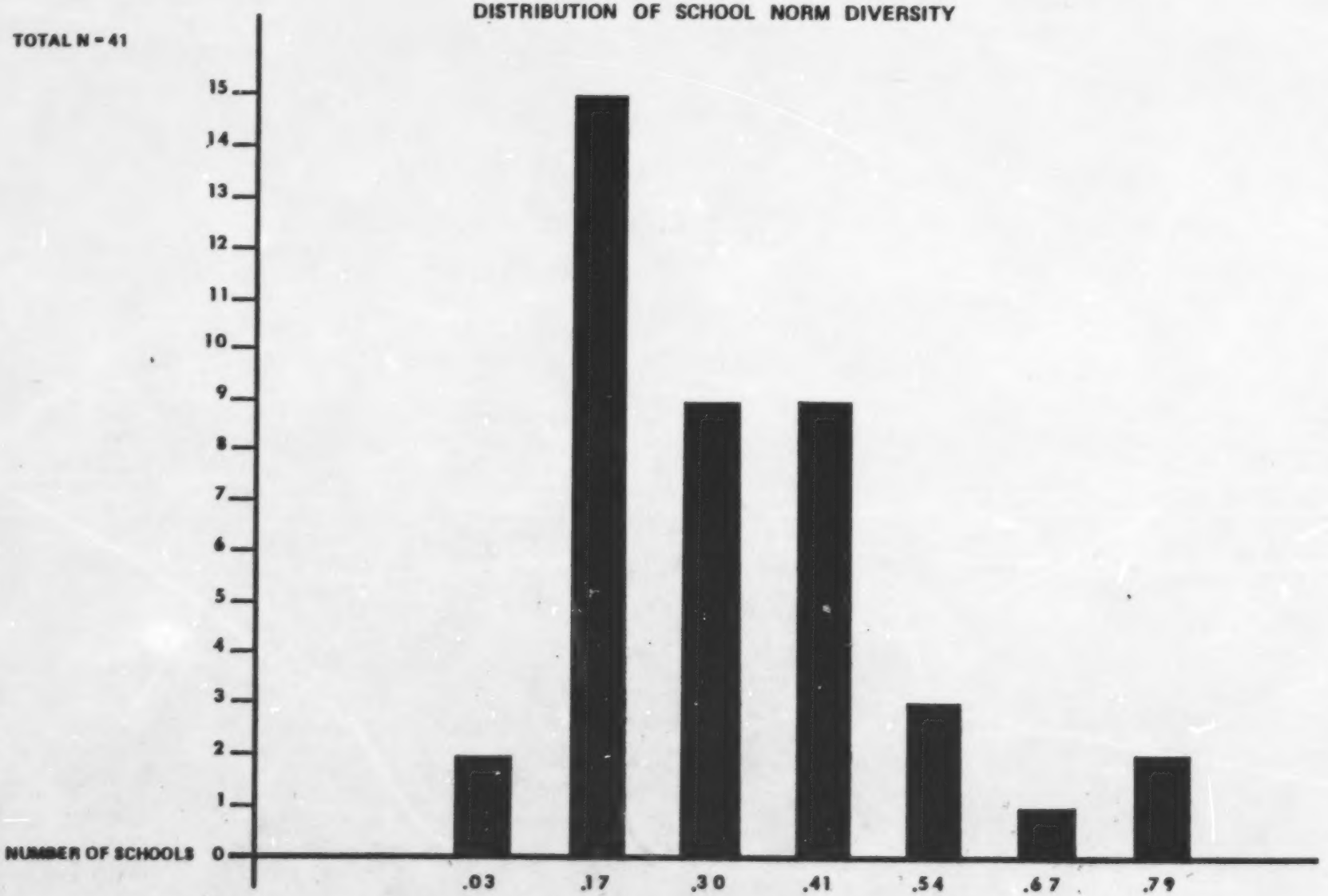
> Where have you read, seen, or heard anything having to do with <u>(idea)</u>?

Subjects volunteered various sources, including specific people, as well as visual and print media. Our interest in the source of the idea as a predictor of innovation is based on the concept of stereotyped information systems; that is, one <u>learns</u> about abstractions, such as thoughts and ideas, from print media, but visual media, such as film and television, <u>show</u> one how to <u>do</u> something. Thus, the source of the idea may possibly explain differences between learning about and implementing innovation.

The final independent variable included in this

FIGURE 2

DISTRIBUTION OF SCHOOL NORM DIVERSITY



analysis concerns teachers' social context of viewing. Most viewers in both experimental treatments were expected to watch alone. After considering the characteristics of traditional in-service, one benefit of interactive delivery for improving professional work productivity was privacy. Continuous program delivery throughout the day linked with an individualized response device, all available in a designated room, was intended to disarm fears among some teachers that participating in in-service can be threatening.

Despite the strain of incompatible work schedules, a surprisingly large number of viewers in both experimental treatments reported they usually watched in-service with at least one person. Sixty-three per cent claimed group viewing as typical. Studies on children and television cited earlier propose that co-viewer interaction reinforcing content may have dramatic effects on both learning and behavior. If this hypothesis applies to adult co-viewing behavior, differences between solo and group viewers should emerge.

As in the adult studies of learning from educational television, we were primarily interested in the dependent variable of what teachers gained from this new form of in-service training, one-way or interactive cable television, as opposed to more traditional and already existing sources of information. The measurement used, however, permitted the collection of richer data than simple recall of program

content. Teachers were asked:

> Are there any ideas or methods you've seen or heard about during the past year for different ways elementary teachers do their work?

After providing descriptions of ideas and methods, teachers were questioned about the content, source, and significance of the idea(s) mentioned. Because we were unable to observe actual classroom behavior or students' learning effects resulting from teacher innovations, we included in the interview a question designed to provide self-reports of innovative behavior:

> Have you tried (idea)?

Thus, we were interested in the process of learning about and implementing innovations as a function of treatment group, exposure to content, structure of communication environment, source of idea, and social context of viewing.

Results

Multivariate analytic techniques must be applied to explicate the relationships of the independent variables (treatment group, exposure, concordance, talking, source of idea, and viewing context) to the criterion variables (number of new ideas mentioned and implementation of one or more of those ideas). Multiple Classification Analysis (MCA), a technique designed to accommodate data unable to meet the stringent linear assumptions of multiple regression, was used for the following analyses. MCA is essentially multiple regression with dummy variables. It

allows the analyst to utilize predictor variables with nominal, ordinal, or interval measurement by transforming each class or category of each predictor into a dummy variable. MCA enables the analyst to assess the bivariate relationships between the individual independent variables and the dependent variable both prior to and following the adjustments in this relationship, accounting for the effects of the other predictors, as well as the overall assessment of multiple prediction.

The first MCA (Table 1) considers the sources of the ideas mentioned, exposure to content, the treatment group to which the school belonged, and the two social structure variables, communication and concordance, in explaining the variance in the total number of new ideas mentioned by individual teachers. Table 2 presents the same independent variables but addresses the implementation issue, that is, did the teachers proceed to try one or more of their new ideas?

In both analyses it appears that agreement about what constitutes good teaching is particularly important in creating an atmosphere where innovation is likely to occur; that is, it appears that diversity of opinion within the school enhances the likelihood of innovation, whereas homogeneity inhibits it. The direction of the group means in both tables indicates that the higher the level of agreement within the individual school, the less likely the innovation. Apparently conflict over what good teaching is

Table 1

MCA of Number of Ideas with Source of Ideas with Source of Idea, Concordance, and Talking

| Source | Unadj. Means | Adj. Means | Concordance | Unadj. Means | Adj. Means | Talking | Unadj. Means | Adj. Means | Treatment | Unadj. Means | Adj. Means | Exposure | Unadj. Means | Adj. Means |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TV/Film | 2.14 | 2.08 | Low | 2.07 | 2.17 | Low | 2.03 | 2.16 | One-way | 2.08 | 1.88 | View | 2.15 | 2.15 |
| Print | 2.04 | 1.97 | Med | 2.06 | 2.08 | Med | 1.71 | 1.71 | Interactive | 2.08 | 2.09 | Noview | 1.67 | 1.69 |
| Meetings | 1.91 | 1.96 | High | 1.70 | 1.58 | High | 2.15 | 2.04 | Control | 1.71 | 1.86 | | | |
| People | 1.83 | 1.88 | | | | | | | | | | | | |

$\bar{X}$ = 1.95
N = 233

where 1 = 1 idea mentioned
2 = 2 ideas mentioned
3 = 3 ideas mentioned

Rank order of betas:

| | |
|---|---|
| Concordance | .25 |
| Exposure | .22 |
| Talking | .18 |
| Treatment | .10 |
| Source | .06 |

Table 2

MCA of Trying One or More Ideas with Source of Ideas with Source of Idea, Concordance, and Talking

| Source | Unadj. Means | Adj. Means | Concordance | Unadj. Means | Adj. Means | Talking | Unadj. Means | Adj. Means | Treatment | Unadj. Means | Adj. Means | Exposure | Unadj. Means | Adj. Means |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TV/Film | 1.64 | 1.66 | Low | 1.66 | 1.55 | Low | 1.63 | 1.58 | One-way | 1.75 | 1.83 | View | 1.64 | 1.70 |
| Print | 1.68 | 1.72 | Med | 1.73 | 1.70 | Med | 1.93 | 1.92 | Interactive | 1.54 | 1.48 | Noview | 1.85 | 1.76 |
| Meetings | 1.83 | 1.80 | High | 1.81 | 1.95 | High | 1.60 | 1.65 | Control | 1.92 | 1.91 | | | |
| People | 1.75 | 1.73 | | | | | | | | | | | | |

$\bar{X}$ = 1.73
N = 233

where 1 = tried 2 ideas
2 = tried 1 idea
3 = tried no ideas

Rank order of betas:

| | |
|---|---|
| Treatment | .29 |
| Concordance | .25 |
| Talking | .23 |
| Exposure | .14 |
| Source | .06 |

all about fosters innovation.

It is also interesting to note that exposure plays a more dominant role in learning about innovations than in implementing them. One seems to learn from viewing the content, but acting on that learning by trying one or more of the ideas is more closely related to the type of school in which one is working--interactive, one-way, or control--than to exposure. Schools assigned to the two experimental treatments seem to adopt atmospheres more conducive to innovative behavior. The technological intervention of simply providing in-service on cable in schools seems to have resulted in more innovative behavior with teachers in interactive schools being the most likely to try new ideas and those in control schools the least likely to do so (adj. means=1.48 and 1.91), whether or not subjects actually viewed the programs.

The mere presence of the novel technology seems to affect the entire organizational environment, so that suddenly innovative behavior earns a higher premium, especially in schools where a diversity of opinion about good teaching predominates.

In addition, low levels of talking among colleagues within the school seem more conducive to learning about and implementing innovations than moderate and high levels (adj. means=2.16 on number of ideas and 1.58 for trying ideas in low talking environments). This finding is somewhat counter-intuitive but perhaps complementary to the

results for concordance. One might well expect low levels of agreement (which enhance innovation) on what constitutes good teaching to accompany low levels of talking (which also enhance innovation). Diversity of opinion does not necessarily result in free and open discussion. Talking about new ideas may involve taking risks and meeting with resistance from one's colleagues. Therefore, the decision to be innovative and try new ideas is largely an independent and individual one.

In terms of instruction, the Multiple Classification Analysis of the number of new teaching ideas mentioned, presents positive learning effects resulting from exposure (adj. mean=2.15 ideas for viewers and 1.69 for non-viewers). There is also evidence in Table 1 of a positive effect for interactive cable as an instructional system with teachers in interactive schools mentioning more ideas (adj. mean=2.09) than those in one-way (adj. mean=1.88) or teachers in control schools (adj. mean=1.86).

Given the apparent effectiveness of cable television in contributing to the diffusion and implementation of innovation from the previous analyses, consideration of various social and experimental viewing contexts may provide greater insight into how the technology achieves its positive results. Thus the final analyses to be presented here (Tables 3 and 4) attempt to disentangle the effects of exposure to the programs by accounting for differences in the social and experimental context of the respondent's

Table 3

MCA of Viewers' Number of Ideas with Source of Idea, Concordance, Talking and Social Context of Viewing

| Source | Unadj. Means | Adj. Means | Concordance | Unadj. Means | Adj. Means | Talking | Unadj. Means | Adj. Means | Social Context of Viewing | Unadj. Means | Adj. Means |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TV/Film | 2.2 | 2.29 | Low | 2.46 | 2.60 | Low | 2.2 | 2.46 | 1-way solo | 1.94 | 1.89 |
| Print | 2.30 | 2.17 | Med | 2.39 | 2.47 | Med | 2.05 | 2.01 | 1-way group | 2.22 | 1.98 |
| Meetings | 2.10 | 2.11 | High | 1.86 | 1.66 | High | 2.38 | 2.30 | 2-way solo | 2.00 | 2.34 |
| People | 2.23 | 2.31 | | | | | | | 2-way group | 2.43 | 2.48 |

$\bar{X}$ = 2.22
N = 107

where 1 = 1 idea mentioned
2 = 2 ideas mentioned
3 = 3 or more ideas mentioned

Rank order of betas:

| | |
|---|---|
| Concordance | .38 |
| Context | .23 |
| Talking | .16 |
| Source | .07 |

Table 4

MCA of Viewers' Trying One or More Ideas with Source of Idea, Concordance, Talking and Social Context of Viewing

| Source | Unadj. Means | Adj. Means | Concordance | Unadj. Means | Adj. Means | Talking | Unadj. Means | Adj. Means | Social Context of Viewing | Unadj. Means | Adj. Means |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TV/Film | 1.67 | 1.65 | Low | 1.42 | 1.28 | Low | 1.40 | 1.31 | 1-way solo | 1.88 | 1.86 |
| Print | 1.49 | 1.56 | Med | 1.64 | 1.53 | Med | 1.77 | 1.75 | 1-way group | 1.71 | 1.85 |
| Meetings | 1.80 | 1.79 | High | 1.68 | 1.90 | High | 1.54 | 1.60 | 2-way solo | 1.56 | 1.39 |
| People | 1.57 | 1.50 | | | | | | | 2-way group | 1.43 | 1.40 |

$\bar{X}$ = 1.60
N = 107

where 1 = tried 2 ideas
2 = tried 1 idea
3 = tried no ideas

Rank order of betas:

| | |
|---|---|
| Concordance | .37 |
| Context | .35 |
| Talking | .24 |
| Source | .16 |

viewing.

Analysis of viewing contexts in terms of one-way versus interactive and solo versus group viewing is of interest here because of the consistent positive effects demonstrated in both laboratory and field studies with adults co-viewing with children. The interaction--labeling, reinforcing, and instructing--that occurs during viewing is a powerful predictor of children's learning. Does such a pattern hold true for adults co-viewing with adults? And if so, is it enhanced by the ability to interact with the medium which can provide technological feedback in addition to interpersonal interaction? No doubt discussions and interactions that occurred during in-service viewing took on a different tone and purpose than a typical teacher-child interaction pattern. However, the result may be similar--discussing and focusing on certain aspects or segments of the content along with at least one colleague and obtaining additional feedback from the medium itself may yield profoundly different results from a solo viewing context in a one-way school.

Again the independent variables in the following MCA's refer to source of idea, concordance, talking, and finally social context of viewing (solo one-way, group one-way, solo interactive, group interactive) added. The dependent variables remain the same: number of ideas and trying one or more of those ideas.

The rank orders of betas for the two analyses are

identical. Concordance, or level of agreement about good teaching, is the most powerful predictor for both number of ideas and likelihood of implementing them. As in the earlier analyses, the relationship between concordance and the dependent variables is negative in both cases; that is, the greater the level of agreement within a school, the fewer the ideas and the less likely the implementation of one or more of them. Not surprisingly, innovative behavior tends to flourish in an environment of diversity, where teaching norms are loosely and individually defined.

Context of viewing ranks second to concordance in both analyses. Interactive group viewing consistently yields greater innovation--more ideas and greater likelihood of implementing more ideas (adj. mean=2.48 for number of ideas; 1.40 for trying ideas), whereas one-way solo viewing is equally consistent, yielding the least innovative group means (adj. mean=1.9 for number of ideas; 1.9 for trying ideas). Means for the other two modes of viewing, which offer some interaction, either interpersonal or technological, fall between the extremes of conjoint interpersonal and technological interaction in group interactive viewing and no interaction whatsoever in solo one-way viewing. It appears that the richer the feedback relating to the content, the more dramatic the effects on both diffusion and implementation of innovation.

In all of the analyses the least powerful predictor proved to be the source of one's ideas. We included this

variable to explore the possibility that the stereotyped nature of the source could produce differential results on learning and implementing innovations. In general, the differences among the group means for various sources are too small to shed much light on this issue.

Implications

The findings outlined above lend further support to literature cited earlier calling for close inspection of the role of co-viewing interaction relating to media content in explaining viewing effects. Few studies have attempted to address the issue because of its complexity. However, the positive impact on learning about and implementing innovations, resulting from viewing contexts offering interpersonal and technological interaction in response to in-service training programs, is quite consistent with literature on children and co-viewing effects. Intuitively it makes a fair amount of sense to argue that the more one thinks about and discusses a topic, that is, the more it is integrated into one's experiences, the more s/he comes to know about it and act accordingly. So it is with television content as the above analyses indicate.

Furthermore, most television studies fail to consider the structural characteristics of existing organizations, such as the family, in conducting research on media consumption. The results for both concordance and talking suggest that the importance of such features inherent in the communication environment should not be overlooked in

studying media behavior. The results of the present study testify to the statement by Comstock et al. (1978) cited earlier, regarding the large gap between what goes on in the real world and what research attempts to investigate. This field study of elementary school teachers suggests that television research has overlooked potentially critical factors, such as feedback and interaction, as well as structural characteristics of the environment, in the quest for direct and predictable effects.

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